AT&T Services, Inc.
1120 20th Street, NW
Suite 1000
Washington, DC 20036

T: 202.457.2055
Mg7268@att.com
att.com

August 2, 2019

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C., 20554

Re: Unlicensed Use of the 6 GHz Band, ET Docket No. 18-295; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, GN Docket No. 17-183

Dear Ms. Dortch:

AT&T Services, Inc., on behalf of the subsidiaries and affiliates of AT&T Inc. (collectively, "AT&T"), submits for the record a recent study conducted by the Electronic Communications Committee ("ECC") of the European Conference of Postal and Telecommunications Administrations ("CEPT") titled "Sharing and compatibility studies related to Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz" ("*ECC Report*").[1] The *ECC Report* examines the co-existence of RLAN systems with, among other things, Fixed Service ("FS") microwave point-to-point links operating in the precise band where RLAN operations have been proposed in this docket.[2] The *ECC Report*, which includes a Minimum Coupling Loss ("MCL")[3] analysis that is far more comprehensive and rigorous than *RKF Report* submitted in this docket previously,[4] finds that significant separation

[1] "Sharing and compatibility studies related to Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) in the frequency band 5925-6425 MHz," Electronic Communications Committee, European Conference of Postal and Telecommunications Administrations, ECC Report 302 (May 29, 2019) (attached as Exhibit A); *available at:* https://www.ecodocdb.dk/download/cc03c766-35f8/ECC%20Report%20302.pdf (last visited July 22, 2019).

[2] The *ECC Report* specifically examines co-existence at 5925-6425 MHz, which has been referred to domestically as the "UNII-5" band. The conclusions in the *ECC Report*, however, are equally applicable to proposed adjacent operations at 6425-6525 MHz ("UNII-6"), 6525-6875 MHz ("UNII-7"), and 6875-7125 MHz ("UNII-8").

[3] The MCL analysis is particularly relevant to this proceeding as it is based on technology neutral parameters and independent of country specific distribution of FSS links and unlicensed part 15 device distribution densities. A single receiver and transmitter type of MCL analysis ensures all FS links, which operate as primary coordinated services in the band, will be protected with 99.999% reliability and is used for protection of incumbent services in other bands like CBRS, AWS-3, and TVWS. Incumbents in this band should be entitled to the same level of protections that the FCC has offered to primary users in other bands.

[4] RKF Engineering Services, Frequency Sharing for Radio Local Area Networks in the 6 GHz Band 24-26 at 53-54 (Jan. 2018) ("*RKF Study*"), attached to Letter from Paul Margie, Counsel, Apple Inc., Broadcom Corporation, Facebook, Inc., Hewlett Packard Enterprise, and Microsoft Corporation to Marlene H. Dortch, Secretary, FCC (filed

distances are required for RLANs, regardless of the morphology of the analyzed area and under varying indoor/outdoor and power conditions. The *ECC Report* thus underscores the need to adopt automated frequency coordination ("AFC") system requirements for ***all*** devices—if any—introduced into any portion of the 6 GHz band.

The *ECC Report*, notably, is based upon RLAN and FS operating parameters that generally parallel the systems under discussion in the U.S. The study examined seven use cases for RLAN devices, with total peak EIRPs ranging from 18.5 dBm (for client devices) to approximately 24 dBm for most access points ("APs"), with some outdoor and high-performance indoor APs operating at up to 30 dBm. The report also carefully considered weighting to address busy hour usage patterns, device distributions, power distributions, assumptions regarding height of operation, operating frequency, deployment modelling, building loss, body loss, and other factors. For FS operations, the report examined systems operating using 64-QAM in 40 MHz and 128-QAM in approximately 30 MHz, with transmitter power ranging, respectively, from -8 dBW or -11 dBW to 2 dBW and antenna gains ranging from 38 dBi to nearly 47 dBi for link lengths in the range of 10 to 90 km—parameters consistent with domestic Part 101 operations using the 6 GHz bands. Moreover, the *ECC Report* adopts a -10 dB I/N protection requirement for FS links and co-primary services based on ITU-R Recommendation F.758 (Table 4), and a -20 dB I/N protection requirement for FS links and systems that are not co-primary.[5] Using those assumptions, the *ECC Report* examined potential interference using an MCL study, as well as a less relevant Monte Carlo analysis based on deployment scenarios in specific European cities and RLAN use assumptions that do not appear to match the proposals in this docket.[6]

Jan. 26, 2018). The *RKF Study* was funded by Broadcom, Cisco, Facebook, Google, Hewlett Packard Enterprise, Intel, MediaTek, Microsoft, and Qualcomm.

[5] Recommendation ITU-R F.758-6: "System parameters and considerations in the development of criteria for sharing or compatibility between digital fixed wireless systems in the fixed service and systems in other services and other sources of interference"; *available at:* https://www.itu.int/dms_pubrec/itu-r/rec/f/R-REC-F.758-6-201509-I!!PDF-E.pdf (last visited July 22, 2019). It is important to note that an I/N of -6 dB has been used in North America to coordinate between co-primary microwave FS links. Although AT&T is continuing to work with vendors to determine an appropriate I/N when a new service—and an unlicensed service at that—is being introduced into the 6 GHz band, AT&T believes a more restrictive limit than -6 dB will be necessary.

[6] The MCL analysis "looks at a range of FS parameters and WAS/RLAN parameters to define a maximum single-entry interference scenario, in a smooth-earth model," and the Monte Carlo study randomly populates—subject to known physical parameters (*e.g.*, population, urban/rural) and subject to weightings based on those parameters—RLAN devices across a geography and analyzes the effect of those devices on actual FS systems. While AT&T understands that the Monte Carlo analysis was performed because an MCL study "does not consider how the interference values vary with time nor how likely it is to find WAS/RLANs deployed at the specific locations needed to drive the interference levels above the threshold," AT&T believes the results of the MCL study offer better guidance for regulators because they can be translated into 99.999% reliability afforded to primary FS services. First, the Monte Carlo analysis involve specific FS configurations and population densities in European cities that do not match how FS systems are deployed in the U.S. For comparative purposes, CommScope conducted a Monte Carlo analysis for the Dallas, Texas market and arrived at substantially different conclusions. *See* Comments of CommScope Comsearch, ET Docket No. 18-295 at 9-14 & Appendix A (Feb. 15, 2019) (attaching

The *ECC Report*'s MCL study found that, for an unlicensed-to-licensed service protection ratio of -20 dB I/N, the separation required in an urban, indoor setting with an RLAN power density of 17 dBm/MHz EIRP ranged from 700 meters to 13.5 km—a keyhole pattern with a 900 meter radius around the FS receiver and a longer, narrow 19.9 km zone extending outward along the boresight of the antenna. Even with power density reduced to 11 dBm/MHz EIRP, the separation required ranged from 900 meters to 16.0 km. These values are summarized in the following table for a range of powers, urban/rural and indoor/outdoor deployments:

Morphology	Deployment Type	Power Density (dBm/MHz EIRP)	I/N = -20 dB		I/N = -10 dB	
			Minimum Separation Distance	Maximum Separation Distance	Minimum Separation Distance	Maximum Separation Distance
Urban	Indoor	17	900 m	19,900 m	700 m	13,500 m
		11	900 m	16,000 m	400 m	10,200 m
	Outdoor	17	900 m	31,700 m	900 m	24,200 m
		1	900 m	20,400 m	800 m	13,900 m
		-6	900 m	16,000 m	400 m	10,200 m
Rural	Indoor	17	4,000 m	36,000 m	1,300 m	28,200 m
		11	2,100 m	31,800 m	600 m	24,200 m
	Outdoor	17	4,000 m	47,100 m	4,000 m	40,400 m
		1	4,000 m	36,500 m	1,400 m	28,700 m
		-6	2,100 m	31,800 m	600 m	24,200 m

The *ECC Report* data strongly supports AT&T's view that unlicensed deployments, if permitted in the 6 GHz band at all, should be universally required to implement AFC system control to prevent operation in an exclusion zone and have the capability of being remotely terminated in the event of interference. Even in cases of indoor deployment and low power deployment—where the RLAN proponents have suggested AFC system control is unnecessary—the *ECC Report* finds substantial potential for exceeding the protection thresholds for FS systems. Indeed, the *ECC Report* specifically observes that, "[u]nfortunately, administrations have no way to control the client AP indoor/outdoor deployment, since they are unlicensed devices," and recommends that "[s]ome additional techniques/restrictions may need to be applied in order to maintain the indoor usage or to mitigate the effect of accidental outdoor use, like a FS data base

engineering study titled "Sharing in the 6 GHz Band by Unlicensed Low-power Indoor Devices"). Second, Monte Carlo simulations have an averaging effect, as discussed in AT&T's response to the *RKF Study*. Third, the Monte Carlo portion of the ECC Report utilizes a -10 dB I/N protection criteria, which is the protection suggested by CEPT for co-primary services—CEPT itself recommends -20 dB I/N for unlicensed to primary service protection. Fourth, the Monte Carlo analysis is based on long term aggregate interference (I/N > -10 dB) of not more than 20% (ITU-R F.758-6) and a Fractional Degradation Performance (average I/N expressed as a power ratio) of less than 10% (ITU-R F.1094-2 and F.1108-4). These criteria are highly optimistic and are not appropriate for analyzing potential interference in this docket. Finally, the *ECC Report* assumes a duty cycle of 1.97% for RLAN devices—a duty cycle that is built on WiFi use. In the U.S., the NPRM proposes no restrictions on duty cycle and the band would not be restricted to WiFi devices, so duty cycles could be significantly higher.

use for coordination, in particular, a geo-location methods [sic] that aims at detecting a spatial closeness between victim and interferer."[7]

Should any questions arise concerning this *ex parte*, please do not hesitate to contact me at (202) 457-2055.

Sincerely,

/s/ Michael P. Goggin
Michael P. Goggin

[7] *ECC Report* at 82.